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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Shamci Monajembashi

SHA-001

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SCHNECK & SCHNECK

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EXAMINER

WHALEY, PABLO S

ART UNIT

PAPER NUMBER

1631

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/687,788	Applicant(s) MONAJEMBASHI, SHAMCI	
	Examiner PABLO WHALEY	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19, 21 and 24-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-19, 21, 24-26 and 28-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Request For Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/30/2009 has been entered.

Status of Claims

Claims 1-19, 21, 24-27, and 28-33 are pending. Claims 16-19, 21, 24-26, and 28-33 are under consideration. Claims 1-15 and 27 are withdrawn. Claims 20, 22, and 23 are cancelled.

Withdrawn Rejections

The rejection of claims 16-19, 21, 24-26, and 28-32 under 35 U.S.C. 112, first paragraph, is withdrawn in view of applicant's amendments filed 09/30/2009.

The rejection of claims 16-17, 19, 21, 24-26, 28, and 30-32 under 35 U.S.C. 103(a) as being made obvious by Bronkhorst in view of Kas and Endlich is withdrawn in view of applicant's amendments filed 09/30/2009.

The rejection of claims 16-19, 21, 24-26, 28-32 under 35 U.S.C. 103(a) as being made obvious by Bronkhorst in view of Kas, Endlich, and Visscher is withdrawn in view of applicant's amendments filed 09/30/2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 16, 19, 21, 24, 25, 26, 28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being made obvious by Kas et al. (US 6,067,859; Issued 30 May 2000), in view of Stromberg et al. (PNAS, 2000, Vol. 97, p.7-11).

The amended claims are drawn to a method for producing optically induced mechanical forces on a target cell that is potentially cancerous comprising: adhering to at least one target cell that is potentially cancerous at least one auxiliary object selected from a group consisting of erythrocytes, haemoglobin, a haemoglobin derivate, a chromophore and a chloroplast; and applying an optical tweezer to said auxiliary object wherein said mechanical forces are induced to said target cell by application of the optical tweezer to said auxiliary object, or a system for inducing optical forces for manipulating a target cell. For

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purposes of applying prior art, the limitation drawn to a target cell that is "potentially cancerous" is broadly interpreted as any cell comprising a nucleus, which satisfies the claim language since any cell with a nucleus is capable of producing genetic mutations or other genetic changes that cause the cell to be cancerous.

Kas teaches a method and system for optically deforming cells using laser beams [Abstract, Col. 4-5, Summary, Fig. 1, Fig. 2]. The optical system is capable of performing optical trapping and force-induced manipulation of a plurality of cells and described as an improved optical tweezer system [See Col. 3, ¶4 and Col. 4, ¶1], which is a teaching for an optical tweezer system. The optical system is used to induce forces in epithelial cells, eukaryotic cells, including cancerous melanoma cells, and non-eukaryotic red blood cells (i.e. auxiliary cells) [Col. 4-5, Col. 7, lines 20-30, Col. 17, lines 55-65], wherein eukaryotic cells meets the claim language for potentially cancerous target cells. The optical system includes a multiple-beam setup operating at 800nm [Col. 13, Results], which inherently teaches long waves in light of the instant specification [p.8]. The setup includes beam forming elements, wherein beam are coupled to optical fibers, modulators, lens, and an inverted microscope [See Col. 7, ¶4, and Col. 8 through Col. 9]. This method is beneficial for detecting cancerous cells by measuring their deformability [Abstract].

Kas does not teach adhering at least one auxiliary to at least one target cell that is potentially cancerous, wherein the auxiliary object is selected from a group consisting of erythrocytes, haemoglobin, a haemoglobin derivate, a chromophore and a chloroplast, as in claims 16 and 21.

Methods for adhering cells and using them in optical trapping experiments would have been well known in the art. In particular, Stromberg teaches methods for optically trapping cells wherein the cells have been fused using chemicals or electrical techniques [See p.9-10, Cell-Cell Fusion section, and p.10, Cell-Vesicle Fusion section]. Cells are then manipulated using their optical trapping system [Fig. 1, and p.9, Col. 1, ¶4 through Col. 2]. The motivation for attaching cells would have been to move them to

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different locations on a surface [p.9, Col. 1, ¶2], or to perform genetic identify experiments by creating specific fusion products [p.7, Col. 2].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Kas by adhering an erythrocyte (i.e. auxiliary objects) with at least one "potentially cancerous" cell, as in claims 16 and 21, since Stromberg teaches methods for optically trapping cells wherein the cells have been fused using chemicals or electrical techniques, as shown above. The motivation for adhering cells would have been to move them to different locations on a surface, as shown by Stromberg [p.9, Col. 1, ¶2], or to perform genetic identify experiments by creating specific fusion products, as shown by Stromberg [p.7, Col. 2].

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being made obvious by Kas et al. (US 6,067,859; Issued 30 May 2000), in view of Stromberg et al. (PNAS, 2000, Vol. 97, p.7-11), as applied to claims 16, 19, 21, 24, 25, 26, 28, 30, and 32, above, and further in view of Nishiguchi et al. (Cell Structure and Function, 1998, Vol. 23, p.143-152).

Kas and Stromberg make obvious a method and system for producing optically induced mechanical forces on target cells, as set forth above.

Kas and Stromberg do not teach coating an auxiliary object with substances that change surface charge such that the target cell and auxiliary object show surface charges with differing signs, as in claim 17.

Kas and Stromberg do not specifically teach the use of fixed erythrocytes, as in claim 18.

Nishiguchi teaches methods for adhering red blood cells using chemicals that change their membrane surface charge [Abstract and p.144, Col. 1, Material and Methods]. RBC are fixed using a particular chemical [p.144, Col. 1, ¶4]. Nishiguchi shows that adhesion between cells is induced by the

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use of cationic reagents as a result of negatively charged cells surfaces becoming positively charged strength [p.147, Col. 2, and p.148, Col. 1].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method made obvious by Kas and Stromberg by coating erythrocytes with substances that change surface charge such that the target cell and auxiliary object show surface charges with differing signs, and fixing erythrocytes, as in claims 17 and 18, since Stromberg teaches chemicals that are well known for facilitating cell adhesion with predictable results [p.9, Col. 1, ¶3], and since Nishiguchi explicitly teaches the use of fixed erythrocytes and cationic reagents for adhering erythrocytes that result in negatively charged cells surfaces becoming positively charged strength with predictable results, as set forth above. The motivation would have been to investigate cell deformation using chemicals capable of inducing morphological changes in RBCs, as suggested by Nishiguchi [p.151, Col. 2].

Claims 29, 31, and 33 are rejected under 35 U.S.C. 103(a) as being made obvious by Kas et al. (US 6,067,859; Issued 30 May 2000), in view of Stromberg et al. (PNAS, 2000, Vol. 97, p.7-11), in view of Nishiguchi et al. (Cell Structure and Function, 1998, Vol. 23, p.143-152), as applied to claims 16-19, 21, 24, 25, 26, 28, 30, and 32, above, and further in view of Endlich (2001; IDS filed 5/21/2004).

Kas, Stromberg, and Nishiguchi make obvious a method and system for producing optically induced mechanical forces on target cells, as set forth above.

Kas, Stromberg, and Nishiguchi do not teach a confocal laser scanning microscope, as in claim 29.

Kas, Stromberg, and Nishiguchi do not teach a target cell that is a podocyte, as in claims 31 and 33.

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Endlich teaches methods for applying mechanical stress and strain to podocytes [p.415, Results, Fig. 1, and p.420, Col. 1]. Additionally, Endlich teaches a confocal laser scanning unit [p.414, Col. 2, ¶3]. This system is beneficial for quantifying changes in cytoskeleton response to mechanical stress [p.414, Col. 2].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method made obvious by Kas, Stromberg, and Nishiguchi by additionally using a confocal laser scanning microscope, and a target cell that is a podocyte, as in claims 29, 31, and 33, since Endlich shows applying mechanical stress to podocytes (i.e. epithelial cells) and measuring results using a confocal laser with predictable results, as shown above, and since Kas shows evaluating mechanical stress in cells [Col. 4-5, Col. 7, lines 20-30, p.415, Results, Fig. 1, and p.420, Col. 1]. The motivation would have been to better understand the unique mechano-sensitivity exhibited by podocytes, as suggested by Endlich [p.420, Col. 1], or to better understand how the cytoskeleton works, as suggested by Kas [Col. 5, ¶1].

Response to Arguments

Applicant's arguments, filed 09/30/2009, that Bronkhorst in view of Kas , Endlich, and Visscher do not teach adhering at least one target cell to a cell that is potentially cancerous have been considered and are persuasive. Therefore the rejection of claims 16-19, 21, 24-26, 28-32 under 35 U.S.C. 103(a) as being made obvious by Bronkhorst in view of Kas , Endlich, and Visscher is withdrawn. However, a new ground of rejection has been applied.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached between 12pm-8pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached at 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Pablo S. Whaley

Patent Examiner

Art Unit 1631

/PW/

/SHUBO (Joe) ZHOU/

Primary Examiner, Art Unit 1631